

R E M A R K S

The Examiner is respectfully requested to return fully initialed copies of the 5 sheets of Forms PTO/SB/08B dated August 22, 2001 and the Form PTO/SB/08A dated March 11, 2004, copies of which were attached to the applicants' REQUEST FOR INITIALED COPIES OF FORMS PTO/SB/08A AND PTO/SB/08B dated April 20, 2004.

Page 15 of the specification was amended to correct a minor clerical error.

Claim 1 was amended to include features from original claim 6 and features supported in the specification on page 1, third paragraph and page 7, last paragraph.

The amendment to claim 5 is consistent with original claim 14.

With respect to Rule 116, entry of the above amendments is respectfully requested, since such amendments place the application in better form for an appeal, should an appeal be necessary.

The presently claimed invention, as reflected in amended claim 1 hereinabove, concerns a method for the evaluation of the ultrastructure of specific connective tissues, namely cartilage,

ligament, tendon, capsule and bone. The presently claimed invention involves the following steps:

(a) providing a fiber optic probe operative in the mid-infrared or near-infrared region of the electromagnetic spectrum;

(b) positioning the probe to be in contact with the surface of the connective tissue for detecting attenuated total reflectance or within a sufficient distance from the surface of the connective tissue for detecting reflection;

(c) detecting mid-infrared radiation or near-infrared radiation penetrating the surface of the connective tissue for detecting attenuated total reflectance or reflecting off of the surface of the connective tissue for detecting reflection; and

(d) analyzing the infrared radiation from step (c) for at least one of peak height, peak area and frequency and comparing at least one of the peak height, the peak area and the frequency to established values for at least one of peak height, peak area and frequency for normal connective tissues to detect a modification in the molecular structure of the connective tissue, and determining the progression of degradation or repair of the connective tissue.

Claims 1 to 20 were rejected under 35 USC 103 as being unpatentable over Zakim et al. USP 5,733,739 in view of Hein et al. USP 5,986,770 and Guzelsu et al. USP 6,324,419 for the reasons set forth on pages 2 and 3 of the Office Action.

It was admitted in the Office Action that Zakim et al. fail to specifically disclose the use of a fiber optic probe and evaluation of connective tissue.

Zakim et al. do not specify any specific tissue. Furthermore, Zakim et al. do not disclose connective tissue as recited in applicants' claims, such as cartilage, ligament, tendon, capsule and bone. All the claims in Zakim et al. are directed to cells, not tissues.

The gist of Zakim et al. is to detect cancerous cells. Zakim et al. thus discuss PAP smear tests and dysplasia.

Zakim et al. evaluate only cells for pre-cancerous and cancerous changes or tissues affected by cancer or another diseases prior to obtaining a biopsy. Such alterations cannot be identified in connective tissue. In contrast to Zakim et al., in the presently claimed invention, changes in cells are not being evaluated but, rather, the presently claimed invention is directed to determining the progression or repair of connective tissue selected from the group consisting of cartilage, ligament,

tendon, capsule and bone. This has nothing to do with malignancy.

Neither Guzelsu et al. nor Hein et al. disclose utilizing infrared radiation to evaluate molecular changes. In both Guzelsu et al. and Hein et al., a light source is utilized, but it is used such that it interacts with tissue, is reflected back, and the "amount" of light reflected back correlates with a bulk tissue property. There is no information in either Guzelsu et al. or Hein et al. concerning the molecular composition of the tissue being examined. With spectroscopy, the technique used in the presently claimed invention, individual frequencies are examined and related to molecular structure. As discussed above, it is specifically recited in applicants' claim 1 "to detect a modification in the molecular structure of the connective tissue".

In Guzelsu et al, the amount of light correlates with the amount of "stretch" in a connective tissue (skin). As discussed above, in Hein et al., no molecular information is provided. Hein et al. essentially characterize a sample by shining light on it, and measuring how the light is scattered back. This can

provide information on some "macroscopic" structures of a sample, but certainly no information on individual molecules.

Guzelsu et al. and Hein et al. concern skin, not the specific connective tissues recited in applicants' present claims.

Therefore, the statement near the top of page 3 of the Office Action that "Such a modification [of Zakim et al., by utilizing a probe such as that described in Hein et al. or Guzelsu et al.] merely involves the substitution of one known type of probe having a light source for another" is not correct. Again, spectroscopy, (studying different frequencies of light or radiation as related to molecular interactions) is substantially different from just looking at the quantity of light (radiation).

The following is stated on page 3 of the Office Action: "Hein et al. disclose infrared spectroscopic evaluation of connective tissue (column 8, lines 11 to 24)." This statement is incorrect, since Hein et al. nowhere mention infrared spectroscopic evaluation.

In summary, Hein et al and Guzelsu et al. do not refer to the same "type" of analysis that is carried out in applicants'

claims. Applicants' presently claimed invention employs infrared spectroscopy to analyze molecules in tissue, not to analyze bulk tissue. An infrared spectrum gives information for the molecules in the tissue, not for a bulk tissue property, or even for the macroscopic structure of the tissue. The peak shifts (frequency changes) recited in applicants' claims are related to molecular vibrations. It is a well-known and extremely well-documented fact in the scientific literature that spectroscopy is a separate field from light scattering or the quantitation of reflective light.

It is respectfully submitted that one of ordinary skill in the art would not arrive at the presently claimed invention from the cited references because (i) Zakim et al. do not concern specific connective tissue recited in applicants' claims (cartilage, ligament, tendon, capsule and bone) and do not teach or suggest detecting a modification in the molecular structure of connective tissue and (ii) Guzelsu et al. and Hein et al. do not teach or suggest using infrared radiation to evaluate molecular changes in the specific connective tissue recited in applicants' claims (cartilage, ligament, tendon, capsule and bone).

It is therefore respectfully submitted that applicants' claimed invention is not rendered obvious over the references, either singly or combined in the manner relied on in the Office Action, in view of the many distinctions discussed hereinabove.

It is furthermore submitted that there are no teachings in the references to combine them in the manner relied on in the Office Action.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



RICHARD S. BARTH
REG. NO. 28,180

FRISHAUF, HOLTZ, GOODMAN & CHICK, P.C.
767 THIRD AVENUE - 25TH FLOOR
NEW YORK, NEW YORK 10017-2023
Tel. Nos. (212) 319-4900
(212) 319-4551/Ext. 219
Fax No. (212) 319-5101
E-Mail Address: BARTH@FHGC-LAW.COM
RSB/ddf